

DOCUMENTS CROSS-REFERENCED

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EL 85-23104/1  
N.C. 03052/85

EXECUTIVE  
ROUTING SHEET

TO:

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SUSPENSE		Date			

Remarks

STAT

Executive Secretary  
24 Dec 85  
Date

3637 (10-81)

JOHN H. GIBBONS  
DIRECTOR

2310/1

Congress of the United States  
OFFICE OF TECHNOLOGY ASSESSMENT  
WASHINGTON, D.C. 20510

To Recipients of OTA's Report on Strategic Materials:

The enclosed errata sheets have been prepared for the Summary booklet and the full-length OTA assessment, Strategic Materials: Technologies to Reduce U.S. Import Vulnerability. The errata sheet that consists of two items should be attached to the Summary booklet (dated January 1985). The errata sheet consisting of 4 items should be inserted in the full length report (dated May 1985).

We appreciate your cooperation in this matter, and regret any inconvenience to you.



JOHN H. GIBBONS  
DIRECTOR

**Congress of the United States**  
**OFFICE OF TECHNOLOGY ASSESSMENT**  
**WASHINGTON, D.C. 20510**

**ERRATA SHEET**

Page 18 -- the first sentence of the last paragraph should read: "Production of platinum group metals is concentrated in the Soviet Union and in South Africa, accounting for 54 percent and 40 percent of 1982 world production respectively."

Page 19 -- the first sentence of the last paragraph should read: "With the U.S. participation in the embargo on purchases of Rhodesian chromium in 1966, the Government sold excess chromium from the National Stockpile but otherwise took little active part, leaving industry to find alternate suppliers."

JOHN H. GIBBONS  
DIRECTOR

Congress of the United States  
OFFICE OF TECHNOLOGY ASSESSMENT  
WASHINGTON, D.C. 20510  
ERRATA SHEET

Page vii, column 1; page 176, column 2, last paragraph; page 247, second column, last paragraph; page 248, first column, second line; and page 404, second column -- References to "Hall Chemical" should read "The Hall Chemical Company."

Page 15 -- the first sentence of the last paragraph should read: "With the U.S. participation in the embargo on purchases of Rhodesian chromium in 1966, the Government sold excess chromium from the National Stockpile but otherwise took little active part, leaving industry to find alternate suppliers."

Page 247-248 -- replace the paragraph beginning halfway down the second column of page 247 by: "At least two other domestic firms - The Hall Chemical Co. of Wickliffe, OH, and CRI Metals of Baltimore, MD - have announced plans to construct facilities to reclaim cobalt and other metals from spent hydroprocessing catalysts. The Hall Chemical Co., which produces approximately 8 million pounds of cobalt salts annually, is testing a pilot facility in northern Alabama said to be able to reclaim individual components of spent catalysts, including cobalt, nickel, molybdenum, vanadium, sulfur, and alumina. The Hall Chemical Co. intends to purchase spent catalysts from generators around the world, and is currently negotiating for a processing site to be located on or near the Gulf coast."

Page 343 -- the second sentence of the last paragraph should read: "Section 205(a) of the law gives the Council responsibility for coordination with Federal agencies and departments 'relative to materials research and development policies and programs.'"

Washington, D.C. 20505

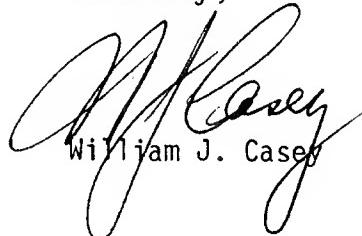
27 June 1985

Mr. John H. Gibbons  
Director  
Office of Technology Assessment  
Congress of the United States  
Washington, D.C. 20510

Dear Mr. Gibbons:

Thank you for your note on strategic minerals vulnerabilities and the accompanying OTA study. I agree that this is an important topic and that the United States should continue to look for new ways to reduce our dependence in this area.

Sincerely,

  
William J. Casey



25 June 1985  
NIC-03252-85

SUBJECT: Letter to John Gibbons from the DCI

DCI/NIC/A/NIO/Econ

[redacted] 25 June 1985) [redacted]

STAT

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5 July 85

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Remarks

To 19: Please prepare appropriate response  
for DCI signature.

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21 June 85

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Congress of the United States  
 OFFICE OF TECHNOLOGY ASSESSMENT  
 WASHINGTON, DC 20510

JOHN H. GIBBONS  
 DIRECTOR

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85- 2310

June 14, 1985

The Honorable William J. Casey  
 Director of Central Intelligence  
 Central Intelligence Agency  
 Washington, D.C. 20505

Dear Mr. Casey:

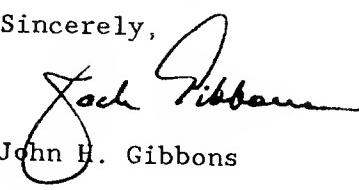
I am pleased to enclose the Report of the Congressional Office of Technology Assessment on Strategic Materials: Technologies to Reduce U.S. Import Vulnerability. This study was done at the request of the Senate Committee on Commerce, Science and Transportation and the House Committee on Science and Technology. A summary of this Report was published in January of this year. Additional copies of the Summary may be obtained by calling the OTA Publications Office at (202) 224-8996.

The United States imports well over one billion dollars worth of chromium, cobalt, manganese, and platinum group metals annually, virtually all of its requirements of these metals. About half of that amount is imported from the Republic of South Africa alone. World production and reserves of these metals, which are essential in a large number of military and civilian applications, are concentrated in two regions: the Soviet Union and southern Africa. Two issues, relations with South Africa and maintenance of military and industrial capability in times of national emergency, have increased Congressional interest in alternatives to continued dependence on such a narrow range of suppliers of strategic materials.

The OTA study assesses possible forms of supply interruptions and discusses the essential applications for strategic materials. It then identifies and evaluates the most promising opportunities to diversify domestic and foreign production, to conserve, and to substitute for each metal. Technical, economic and institutional barriers to the implementation of the alternatives are assessed and potential governmental actions to reduce or overcome the barriers are reviewed. The report concludes that there is great potential to reduce dependence on southern Africa and the Soviet Union, but that five to ten years of effort are required before the potential can be fully realized. Unless the Government encourages and assists private industry to implement the alternatives, they will be of only limited use if and when interruptions take place.

I hope you will find the Report useful and informative.

Sincerely,

  
 John H. Gibbons

Enclosures

DCI  
 EXEC  
 REG



# OTA REPORT BRIEF

June 1985

## Strategic Materials: Technologies to Reduce U.S. Import Vulnerability

The nations of southern Africa are the United States' major suppliers of chromium, cobalt, manganese, and platinum group metals (PGMs), all essential to defense and the civilian economy. The principal alternative supplier to the United States is the Soviet Union. Reliance on the Soviet Union is an obvious concern, but there is also uncertainty about the continuity of supplies from southern Africa.

There is almost no domestic production of any of these metals. The United States maintains a stockpile of strategic materials, but it can only be used for defense applications. The non-defense economy remains vulnerable to disruptions of supply.

No single technical approach to reduce U.S. reliance on imports of strategic materials will work by itself. A combination of actions, specific to each metal, must be undertaken. An overall strategy would encompass three technical approaches:

**1. Diversify the supply of strategic metals by developing known deposits, both foreign and domestic, and by exploring for new deposits.**

The production of cobalt and manganese can be diversified through expansion or development of known deposits in Australia, Indonesia, the Philippines, Canada, Brazil, Mexico, and Peru. Opportunities to diversify chromium and PGM production are more limited. The PGM deposit in Stillwater, Montana, is one of the few deposits under active consideration for exploitation.

Exploration for deposits of strategic materials is difficult, expensive, and often unsuccessful. Improvements of geologic understanding and the tools of exploration would increase the likelihood of success.

**2. Decrease the demand for strategic metals by improving manufacturing processes and recycling of strategic metals from waste and scrap.**

Improved casting and forging technologies are already reducing cobalt requirements for the manufacture of superalloy components for jet engines, the largest and one of the most critical uses of cobalt in the United States. Similarly, improved steelmaking technologies and operating practices and the increased use of electric arc furnaces may reduce by about 50 percent the imported manganese needed to produce each ton of domestic steel.

Recycling of PGMs from automobile catalytic converters is increasing, and will become a major source in the future. Technologies for the recovery of chromium and cobalt from obsolete products have been developed and appear promising. However, low metal prices and the cost of testing new processes discourage the investments needed for commercialization.

**3. Identify and test substitute materials for current applications and develop new materials with reduced strategic material content for current and future applications.**

Potential substitutes for stainless steel have been developed that could reduce chromium requirements in many applications by one-third, and laboratory tests indicate that it is possible to reduce cobalt content of many superalloys by about 50 percent. In the longer term, improved ceramic and composite materials may become important alternatives to chromium and cobalt alloys.

Although substitute alloys may have lower requirements for strategic materials, they offer consumers only limited economic advantages, which are often offset by the cost of testing and certification of the materials and modification of manufacturing processes.

Advanced casting and forging techniques, improved steelmaking systems, and recycling processes for automotive catalytic converters are economically advantageous and are being implemented by private industry without Government intervention.

However, other technological approaches will achieve only limited application, unless the Government takes a larger role in promoting the development and use of strategic materials technology.

### Policy Options

The Government could take a number of actions, spanning a range of cost and degree of involvement, to promote the technical alternatives to strategic materials vulnerability:

- Emphasize the collection and dissemination of mineral and material data to improve planning

The Office of Technology Assessment (OTA) is an analytical arm of the U.S. Congress whose basic function is to help legislators anticipate and plan for the positive and negative impacts of technological changes. Address: OTA, U.S. Congress, Washington, DC 20510. Phone: 202/224-8996. John H. Gibbons, Director.

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Director

JOHN H. GIBBONS

Hold for release until:  
Sunday, June 16, 1985, AM'sFor further information, contact  
Ellen Mika or Jean McDonald  
(202)226-2115

Washington D.C.--With five to ten years of effort, the United States could be free from its dependence on South Africa and the USSR for supplies of some strategic materials, according to a report released today by Representative Dan Glickman (D-Kansas), Chairman of the Subcommittee on Transportation, Aviation and Materials of the House Committee on Science and Technology. The report was prepared by the Congressional Office of Technology Assessment (OTA).

Nations of southern Africa are the United States' major suppliers of chromium, cobalt, manganese, and platinum; the principal alternative producer is the Soviet Union. Only a small amount of these important metals is produced domestically. The report contains a detailed analysis of the strategic materials technologies and policy options that were outlined in the Summary issued in January.

Although the United States maintains a stockpile of strategic materials for defense applications, the non-defense economy remains vulnerable to disruptions in supplies of these metals, says OTA.

Technical solutions exist--diversifying sources of supplies, improving the prospects for conservation and recycling, or accepting substitute materials. However, few of these alternatives can be implemented immediately. Some are near commercialization, others required further testing, and still others are only beginning to be developed. Some of the approaches require long leadtimes--for example, qualifying low cobalt alloys for use in aircraft jet engines could take ten years. Also, OTA reports that the use of non-metallic materials such as ceramics and composites as alternatives to strategic materials for critical applications will require many more years of research and development.

Since private industry is the primary producer, importer, and consumer of strategic materials, private industry - not the Federal Government - will decide where new mineral development will take place and how to use substitute materials and conservation and recycling technologies. However, the Federal Government is

MORE

able to influence private decisions by supporting research and development, compiling and disseminating information on substitute materials, conducting minerals exploration on federal lands, or by using federal financial assistance or tax incentives to influence private investments.

Although many of the technical alternatives have been identified through federally supported research and development, OTA points out that recent legislation on materials policy has not been carried out. To reduce strategic materials vulnerability, the Administration could establish goals and coordinate federal actions.

Recent history provides a basis for questioning the reliability of foreign sources of strategic materials. In the past 25 years, the United States has had four major disruptions in the supply of important materials. The first occurred in 1949 when the Soviet Union stopped the export of manganese and chromium ore to the United States. The second was the boycott of chromium from Southern Rhodesia (now Zimbabwe). The third was a many month hiatus in the import of nickel from Canada during a prolonged strike. Most recently, political disturbances in Zaire triggered major disruptions in supplies, inventories, and prices for cobalt.

OTA's conclusions are based on an extensive review of technologies for mineral production, distribution of resources of strategic minerals, advances in recycling and manufacturing, and substitute materials. OTA also evaluated the economic and institutional barriers to the adoption of the technologies.

The report was requested by Congressman Don Fuqua (D-Fl), Chairman of the House Science and Technology Committee; Congressman Glickman; and Congressman Doug Walgren (D-Pa), Chairman of the Subcommittee on Science, Research and Technology; and by Senator Robert Packwood (R-Or) when he was Chairman of the Committee on Commerce, Science and Transportation.

OTA is a non-partisan analytical agency that serves the U.S. Congress. Its purpose is to aid Congress in dealing with the complex and often highly technical issues that increasingly confront our society.

Copies of the report, Strategic Materials: Technologies to Reduce U.S. Import Vulnerability, are available to the public from the Government Printing Office, phone - (202) 783-3238. The GPO stock number is 052-003-00979-0. The price is \$14.00.

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MORE

CONGRESSIONAL COMMENT

Representative Dan Glickman, (D-Kansas), Chairman of the Subcommittee on Transportation, Aviation and Materials of the House Committee on Science and Technology:

"This report points to a number of steps we can and should be taking to minimize our materials dependence on nations such as South Africa. Given the political unrest in that region of the world, as well as our need for greater flexibility in our South African foreign policy, I believe Congress and the President should move swiftly to take action on the report's recommendations."

Representative Charles E. Bennett, (D-Florida), Chairman of the Subcommittee on Seapower and Strategic and Critical Materials of the House Armed Services Committee:

"The OTA report is important because it shows that considerable time would be needed in an emergency before alternative materials and suppliers could be found to replace or supplement current materials sources. It is during this period, which could be 3 to 5 years, that the national defense stockpile would be so essential to supply the strategic and critical materials needed to support the rapid increase in production for defense needs."

Representative George E. Brown Jr., (D- California), Member of the Technology Assessment Board:

"This report is an important contribution to the study of U. S. vulnerability to the import of strategic materials. The U. S. economy and national security interests indicate the need for government action in this area, but the Administration has been slow to implement the National Critical Materials Act passed by Congress last year. This law provides for the establishment of a National Materials Council and a national program for advanced materials research and technology; and for the promotion of innovation and improved productivity in materials industries. OTA's report provides ample evidence of the need for prompt action on U.S. strategic materials import vulnerability."

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The Director of Central Intelligence

Washington, D.C. 20505

27 JUN 1985

Mr. John H. Gibbons  
Director  
Office of Technology Assessment  
Congress of the United States  
Washington, D.C. 20510

Dear Mr. Gibbons:

Thank you for your note on strategic minerals vulnerabilities and the accompanying OTA study. I agree that this is an important topic and that the United States should continue to look for new ways to reduce our dependence in this area.

Sincerely,

/s/ William J. Casey

William J. Casey

DCI  
EXEC  
REG

25 June 1985  
NIC-03252-85

SUBJECT: Letter to John Gibbons from the DCI

DCI/NIC/A/NIO/Econ [REDACTED] (25 June 1985) [REDACTED]

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